1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

133 Landforms. Flat surfaces are a characteristic feature of the landscape of the Recôncavo. Where these flat surfaces are low and undivided, they form the plains of the coast and the central Recôncavo. Where they are higher and separated by valleys into relatively extensive tabular segments, they form the uplands of the north and west of the region. Where the flat surfaces are dissected into numerous small tabular or rounded segments, they form the belt of intermediate hills. The slopes separating the hills and the uplands have different forms. Some tabular surfaces are separated by steep and rugged slopes, occasionally leading to flat valley floors. In other cases rounded slopes are common. The accompanying map of east-central Bahia delineates four zones in each of which a distinctive association of these various forms is characteristic.[1]

The Tabular Uplands. The Tabular Uplands have a landscape of considerable simplicity. They have been formed upon a surface of relatively flat-lying sedimentary rock, generally Tertiary sandstone, although sometimes Cretaceous shale has been exposed in the valleys.[2] The surface has been subdivided by stream erosion into tabular segments called taboleiros. Many of these taboleiros are very extensive: one continuous taboleiro on the northern border of the Recôncavo covers a large part of northern Irará, southern Inhambupe, and eastern Serrinha. They are essentially plain surfaces with a local relief on the order of ten meters or less. At the edges these tablelands break away sharply into very rough zones, often of badland topography. The larger valleys are cut one hundred meters or so below the upland surface. Minor valleys are generally narrow, but the major streams have cut laterally so that they have produced relatively flat-bottomed valleys up to two

134 or three kilometers wide. The taboleiro surface is commonly mantled

[TEXT CONTINUED ON PAGE 18]

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

133 in a layer of porous sand, and surface drainage is not well developed.
134 The valley floors are often choked with loose sand brought down from the upland, which is re-sorted and shifted by the rising streams in the wet season.

133 The southern part of the Tabular Upland zone, which borders the Recôncavo, is drained by two major river systems which flow directly eastward to the open ocean. The Rio Inhambupe rises in the midst of the vast taboleiros of Serrinha, Inhambupe, and Irará and skirts the northern boundary of the Recôncavo. The southern edge of the Tabular Upland zone, lying within the Recôncavo, is drained by tributaries of the Rio Pojuca, which flow southward to join the main stream in its eastward course to the ocean.

The Crystalline Uplands. Tabular surfaces of a different order are characteristic of the crystalline zone which stretches from the western margin of the Bay westward to the Chapada Diamantina. These surfaces have been formed upon a relatively flat platform of crystalline rock--the so-called crystalline peneplain of Eastern and Northeastern Brazil. In this part of Bahia, however, the rock surface usually is buried deeply under a layer of residual mantle and appears only on valley walls and bottoms. The mantle has been dissected into tabular segments which are generally smaller than those of the Tabular Uplands. The valley formation is more distinctive: after an abrupt break the slopes form a continuous curve so that the valley bottoms are relatively more narrow and are gently sloping. Rising above the general upland level are occasional monadnocks with rounded, often rocky, surfaces.

So similar are the upper surfaces of the crystalline zone to those of the Tabular Uplands that the individual surfaces occasionally

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

133 are called taboleiros. This similarity is enhanced by the occasional
[134] appearance of sandy surface materials. However, the taboleiros of the Tabular Uplands are generally extensive; the individual uplands of the crystalline zone are generally of limited area. Valleys are an exceptional and areally limited part of the Tabular Uplands; in the crystalline, the valleys occupy a very significant part of the land, although collectively the area in tabular surfaces exceeds that in valleys.

The upland surfaces of the crystalline, like the Tabular Uplands, lack surface drainage. Where the upland surface is extensive, shallow circular depressions are often encountered. Some of these form large, shallow lakes or swamps overlying impervious clay layers. Equally characteristic is a small circular depression, ten to fifty meters in diameter, with a pit in the center through which water drains into the porous subsoil.[3] Neither of these depression forms was observed outside the crystalline zone.

Swamps and ponds are also found in the valley bottoms. Very often a resistant section of bed rock forms a constriction in the valley walls, and when this constriction becomes choked, streams are partially dammed. The streams themselves almost invariably originate in springs at the bottom of steeply sloping valley walls. A very characteristic site for these springs is in the very regular ampitheater-like bowls at the valley heads.

Almost all of the Crystalline Uplands of the Recôncavo are drained by a single river system—the Paraguaçu. The main stream and its major tributaries rise in the Chapada Diamantina and the Serra da Sincorá far to the west in central Bahia. By the time it has reached the Recôncavo, the Paraguaçu is deeply entrenched in the upland. It

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

133 The parts of the Coastal Plain along the ocean and above the Bacia do Iguape are drained by local streams. In the more extensive plain north of the Bay there are a number of larger and more significant rivers and streams. The northern part of the latter area is drained by the Rio Pojuca, the middle part by the Rios Jacuípe and Joanes, and the southern part by the Rios Traripe and Sergi. The Traripe and Sergi enter the Bay, but the other, larger streams drain eastward to the ocean. Except where the Traripe and the Sergi cross the rough edge of the plain, all the stream valleys are relatively shallow.

The Bay. There remains a last section to deal with—a very significant part of the Recôncavo, but not properly a "landform" area. This is the Baía de Todos os Santos. The Bay may be viewed as a central parallelogram which contains within it the deep water and which has a number of shallow, jointed channels extended from the corners. Beyond these channels, estuaries extend the Bay inland in three directions. Structurally the Bay is a part of the rift valley, but its present outline corresponds to the major fault scarp in only one place—in Salvador. Here the scarp separates the upper and lower [134] sections of the city. Elsewhere the form of the Bay is determined by erosion of, and to a lesser extent, deposition upon the folded and faulted sedimentary deposits accumulated within the rift. These processes have produced a northern coast of bluff-enclosed bays and steep-sided archipelagoes, a western coast which is relatively straight and which rises to a higher elevation above the Baía de Todos os Santos, and on the south, the island of Itaparica, which stands like a door half-closed across the entrance to the Bay.

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

133 characteristic of the Crystalline Uplands; while in the hill zone the individual flat surfaces are very small.

Local relief is usually greatest in the uplands, near the major rivers, such as the Paraguaçu, Jacuípe, and the Inhambupe, and where these rivers cross the hill belts. On the plains the local relief is usually about fifty meters, but north of the Bay about twenty-five meters.

Soils

134 Introduction. Fertile soils are not extensive in the northeast of Brazil. In this respect it is typical of the tropics, where only singularly propitious base materials or exceptional genetic processes have succeeded in producing soils of high natural fertility. As a result of the prevailing infertility, the limited fertile areas have an extraordinary importance.

Bondar testifies to the general infertility of the soils of Bahia and thus indirectly to the significance of the areas of good soil:

> The modest percentage of the soil which is cultivated, in relation to the expanse of territory, does not allow us to conclude that it is still too early to worry ourselves with the conservation of agricultural soils. Arable land is scarce in Bahia. There are great expanses of territory which are not suitable for the cultivation of annuals.[5]

Perhaps the lack of interest in soil conservation in the Recôncavo is a result of the almost mystical faith in the unending richness of the massapê--the Cretaceous soils of the sugar cane zone.

The Recôncavo as a whole is an area of only moderately fertile soil. There are many zones of extreme infertility. The soils of the Recôncavo generally have been divided into three general types, and as will be seen, tend to have a distinctive pattern of land use.

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

• 134
114 Soil mapping and analysis are still in a preliminary stage in Bahia. The most comprehensive source, the work of Bondar, includes a soils map of the state on a scale of 1:3,000,000.[6] Although the scale of this map is too small to give precise information for the Recôncavo, his accompanying description is in greater detail. It is based upon geologic zones. The discussion of soils below is based primarily upon the descriptions of Bondar, but the soils regions are derived from a more detailed geologic map.[7] Although the system of classification of Bondar has been retained, his soils descriptions were modified in some details to conform to the field observations of this research.[8]

The System of Classification Based upon Bondar.[9]

1. Clay soils of Cretaceous origin
   a. massapê (heavy dark clay)
   b. salão (light reddish clay)
   c. areia (sands)
   [d. clay soils of taboleiros]

2. Sandy soils of Tertiary taboleiros
   a. valley alluvium
   b. taboleiro soils
   c. sands of crystalline zone

3. Variable crystalline soils originating on Archeozoic rocks
   a. poor soils from clear, white acid rocks } 1. light upland soils
   b. better soils from neutral pigmented rocks } 2. red and brown clays
   c. good soils from dark basic rocks } 3. crystalline massapê
   d. good soils from clear rocks
      1. granite-calcite
      2. feldspar-mica-amphibole

[4. Calcareous soils from Algonkian rocks]

[5. Soils from sandstones of Paleozoic and Algonkian chapadas]

[6. Mixed soils of fluvial origin.]

Note: Soils types which are bracketed are part of Bondar's system but do not appear in appreciable areas of the Recôncavo.

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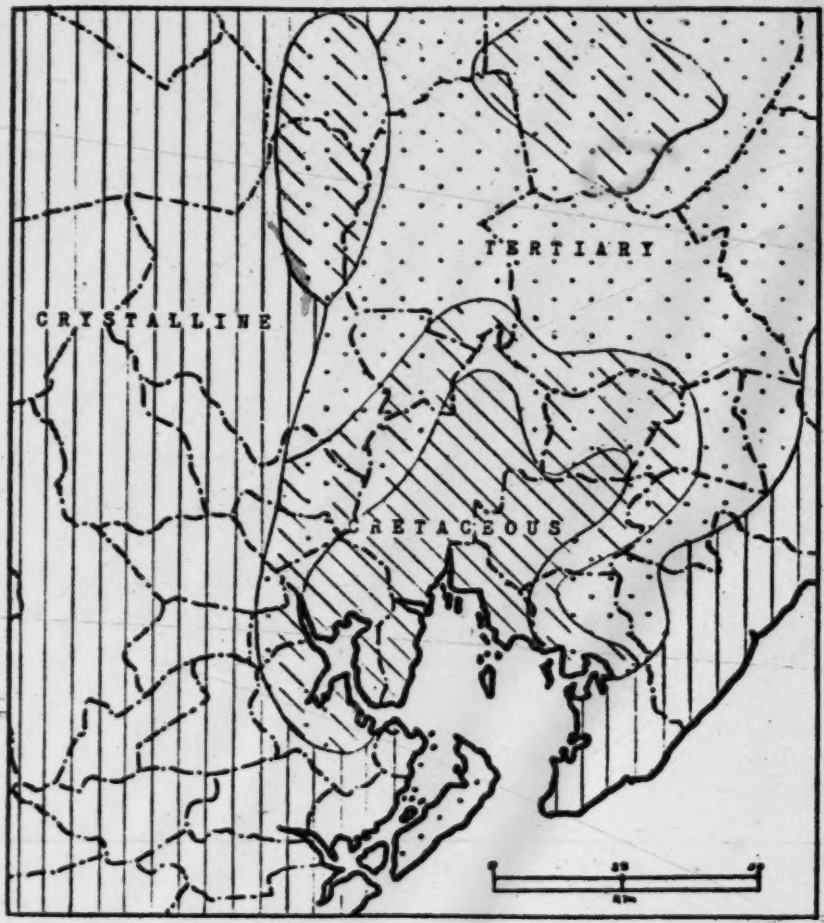

RECÔNCAVO OF BAHIA

Soil Types

Modified from maps by Gregorio Bondar, "Solos da Bahia, Sua Conservação e Aproveitamento," and Sylvio Froes Abreu, "O Recôncavo da Bahia e o Petróleo do Lobato."

MAP 6

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

134 Clay Soils of Cretaceous Origin. The Cretaceous soils occupy an extensive zone in the Recôncavo, chiefly on the northern perimeter of the Bay and in the adjacent coastal plain compartment. These soils are predominately colloids of clays derived from calcareous shales and sandstone through the decalcification and mixing of materials. The result of these processes has been an extremely adherent and coherent clay with good water holding capacity, moderate depth, and marked resistance to erosion. In dry seasons it develops deep cracks and is thus, to some extent, self-cultivating. This is a good soil for general agricultural purposes, but in the Recôncavo it is usually used for sugar cane.

The clay soils are by no means uniform, and the cultivators of the area distinguish by local names three types which correspond to different mixtures of sands and clays: massapê, salão, and aréia.

"Aréia" means sand, and the soils of this designation are the sandiest of the Cretaceous soils. As the term is commonly used in this area it seems not to refer to the relic deposits of Tertiary sands, in situ, but rather to soils derived from the mixing of these Tertiary sands with Cretaceous clays or to soils derived from the sandier Cretaceous materials. Whatever their origin, the aréia soils range in composition from sands to sandy loams and in color from grey to dun. [249] From the point of view of yield, the aréia soils are considered to be the least valuable by the sugar cane growers of this zone.[10] They are, however, the most easily worked soils of the Cretaceous series, especially when wet, and this is a significant virtue, because these soils are located in a zone of heavy precipitation.

The massapê is the soil par excellence in the tradition of the Recôncavo. Brazilian soil scientists classify this soil as an argila (clay). However, the following citation from an American geologist

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134 suggests a better English equivalent:

> North of the Bay of Todos os Santos lies an undulating region some sixty miles long by thirty wide. The soil of this region is a cretaceous marl, exposed by the tertiary overburden having been eroded away. The deposit is of great thickness and may be compared with the black gumbo Belt of Southern Arkansas and Northern Texas.[11]

The fertility of the massapê is established by both chemical analysis[12] and the history of agriculture in the Cretaceous zone. For four centuries these soils have supported a system of intensive sugar cane cultivation, presumably without severe decline in yield. Soil fertilization was practically unknown until the last half-century and is still uncommon.

134 An element in the local mythology of the massapê is that it is 133 completely resistant to erosion; and indeed there seems to be little erosion in most areas of massapê soil. However, the southern edge of the massapê zone, drained by the Rios Traripe and Sergi, is deeply and severely gullied. In the north the downcutting of the Rios Jacuípe and Joanes apparently has been limited by the resistant barrier of crystalline rocks through which the rivers pass in their seaward course.[13] The low gradients of these streams may have restricted stream bed erosion and reduced the erosion of the interfluves.

134 Sandy Soils of the Tertiary Taboleiros. While the Tertiary deposits and the soils derived from them have been removed almost entirely from the mainland areas close to the Bay, they still cover most of the land surface farther north. Most of the Tertiary soils are derived from fine-grained and weakly-cemented sandstones. The sandy soils are variable in depth, but very thick soils are not uncommon. Because of their porosity, these sands are extremely vulnerable to drought. They are easily eroded and especially subject to gullying. Their fertility, especially in situ, usually is very low.

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134 The taboleiro (upland) soils of this type are in some areas almost sterile, completely unsuited to cultivation. Even the best of the upland Tertiary soils is relatively unproductive. Whether the [132] soils are deep or shallow, the crops grown upon them suffer severely from desiccation during the dry season and during the perennial droughts characteristic of the northeastern interior. The porous [133] character of these sands has restricted the development of surface streams and of erosion in the centers of the taboleiros. On the edges the exposed slopes of the taboleiros have been gullied deeply.

Two contrasting soil types are found in the valleys. Sands carried from the uplands have mixed with fresh materials and with small quantities of humus and have produced more fertile sandy soils. These alluvial soils are much more intensively used than those of the taboleiros, but cultivation is hazardous because of frequent flooding. Where the main streams--such as the Rio Inhambupe--have cut deeply they have exposed the underlying Cretaceous series. In these deeper valleys the soils are very similar to those of the larger Cretaceous zone to the south.

The boundary between the zones of Tertiary and Cretaceous soils is broad and irregular. The surfaces of the interfluves are covered with Tertiary sands; the deeper valleys have Cretaceous clays. The wide boundary zone has never been mapped in any detail; therefore the location of the common border on the map of this study can be drawn only approximately. A few Tertiary sands are found in the crystalline zone to the west--these will be discussed below.

Soils of the Crystalline Zone. The geologic and topographic maps which are available for the Recôncavo are a useful guide to the distribution of soils derived from sedimentary deposits. However, in

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

134 the crystalline zone, where the intricate alternations of granites, gneisses, and schists have not been mapped, there is no such guide to soil distributions.

Bondar has divided the soils of the crystalline zone into four types, based upon the character of the rock material, but these soil types have not been mapped. The lack of geologic maps limits the utility of his classification in a study of this scale.

Field observations in the course of this research suggest that, at least as far as the Western Recôncavo is concerned, topography is a useful guide to soils on the crystalline rocks. Tabular uplands, slope lands, and valley bottoms each have characteristic soil associations.

The common upland soils are extremely deep--20 to 30 meters is not at all uncommon--and except for a thin surface layer disturbed by cultivation or by roots, they are physically uniform from top to bottom. They are usually brown sandy loams, often with a large percentage of very coarse dark sand and with a complete absence of rock particles of any size except for the last few centimeters in contact with the rock surface. These soils are very porous, generally lacking any sort of surface drainage, and are very flat-lying. The name tabuleiro (tableland) is applied to both the surface and the soil of this zone, as well as to the surface and the soil of the Tertiary tabuleiros which are so similar. These upland soils apparently are very ancient and heavily leached, thus relatively infertile. In the drier areas they are sometimes saline.

On the relatively steep but usually rounded slopes of the Crystalline Uplands the rocks generally come nearer to the surface. On these slopes the sandy loams are replaced by reddish brown clay-loams and clays, which are usually extremely plastic. Rock fragments are common.[14] Clay-loams and clays are the best general purpose soils of

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134 the Crystalline Uplands. Although in slope, these soils stand up remarkably well under abusive cultivation methods. The general distribution of these upland and slope-land soils is related to the pattern of landforms in the Recôncavo. In the Intermediate Hills the red-brown argillaceous soils predominate. In the Crystalline Uplands the arenaceous soils occupy the largest area, but the slope-land clays and clay-loams are also extensive.

On the less well-drained valley floors and in the shallow depressions on the uplands, a soil has developed which locally is called massapê or crystalline massape[15] because of its resemblance to the massapê of the Cretaceous zone. In the depressions a black or grey marl is common. It is very similar, at least in physical character, to the Cretaceous massapê In the valleys the soils are less argillaceous but have a greater humus content. Although heavy and sometimes acid, especially in the depressions, these soils are very useful when drained. However, draining the soil is usually an insuperable problem for the small cultivator. Nevertheless, he finds some use for the soil, for he laboriously transports it to the upland to use as a fertilizer. [241]

Soils derived from non-crystalline rocks are also found in the crystalline zone. In the Western Recôncavo the Tertiary deposits were laid down directly on the crystalline rocks. In some areas there are minor remnants of these rocks. Over more extensive areas, Tertiary-derive soils are the characteristic surface material, locally called aréia branca (white sand). These soils are almost pure sand, very light colored and very porous and infertile. Such soils are frequently encountered south of the Rio Paraguaçu. Similar soils are found along the crystalline-sedimentary boundary north of the river. These may not be residual--it is possible that they were transported westward from the main Tertiary zone by wind or stream action. Though aréia branca is a characteristic feature of much of the Western Recôncavo, this soil is not typical of the area farther west.

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134 The soils of the peninsula northeast of the city of Salvador are chiefly crystalline-derived. Near the sea and extending inland five or [245] ten kilometers is a belt of white sand dunes, which are not cultivated but are planted in coconut palms. Bondar reports some fertile diorite-derived soils in the peninsula above Salvador, but does not precisely locate the area.[16] Observations in Salvador and its environs suggest that at least two soils of the Western Recôncavo, the crystalline massapê and the slope-land clays and clay-loams, are characteristic also of the peninsular area.

134 133 Alluvial Soils. The areas of alluvium in the Recôncavo are so limited that it might almost be said that there are no alluvial soils. There are no conspicuous deltas. Along the margin of the Bay and the estuaries which feed into it there is usually a precipitous decline from the plains or hills to the narrow beach. Narrow lowlands with alluvial soil were observed in three areas: (1) on the west coast of the island of Itaparica and on the mainland opposite; (2) on the north side of the Bay between the Rio Sergi and the island of Madre de Deus;[17] and (3) along the estuary of the Rio Paraguaçu between the cidade of Maragogipe and the head of the Bacia do Iguape. These marginal alluvial lowlands cover only a very limited area of the total Recôncavo. Most of the alluvial lands are mangrove swamps or very low-lying semi-swampy [241] plains. No cultivation was observed in any of these alluvial areas.

Most of the valleys of the Recôncavo are so narrow that except in the major valleys of the Tabular Uplands, river bottom alluvium is rare.

Soils - Conclusion. The soils pattern which has been developed above is closely related to the patterns of parent material and topography. These correlations are in part a reflection of strong functional relationships between material, terrain, and soil in the Recôncavo. These

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133 correlations are in part only apparent: they result from using geologic and topographic categories to map and classify soils.

13 Both climate and vegetation are also important factors in soil formation. Since the Recôncavo is a zone of sharp transitions in climate and vegetation, it is to be expected that these variations would be reflected in the soil pattern. In the Recôncavo, however, patterns of climate and vegetation generally re-enforce the patterns of material and terrain as they affect soils. The Cretaceous coastal lowlands are the most humid part of the Recôncavo. The inland Tabular and Crystalline Uplands, which is to say the Tertiary and crystalline soil zones, are markedly drier, as will be seen below. Thus the boundary between the Cretaceous and non-Cretaceous soils approximates a climatic transition, a transition which is also the forest and scrub-forest boundary.

134
24| The soils of the Recôncavo have been used for agricultural purposes for a long time--for about 400 years in the Cretaceous zone. They have been used with varying intensity: in the Cretaceous zone under an intensive monoculture, in the other soils zones under less intensive systems of field and fallow or as wild pasture. The affects of this prolonged use, with little soil conservation, can be only inferred. In the Cretaceous zone there is much complaint of low sugar cane yields, and a few cultivators are turning to commercial fertilizer. It is not clear whether these complaints and remedies result from a marked deterioration of the soil or from the declining competitive position of the sugar industry of the Recôncavo. In the crystalline zone it seems likely that only in the last few decades has cultivation become sufficiently intensive to cause--through shortening the fallow period--the deterioration of the soils. This affect is now beginning to be noticeable in the relatively intensively cultivated lands near the Rio Paraguaçu.

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241 The different cultivation practices of the agricultural systems associated with the soils zones seem likely to intensify the present soils pattern. If commercial fertilizer is used on an increasing scale in the Cretaceous zone and if intensification of cultivation continues in the crystalline--as seems possible--the differences between these soils will be accentuated. It is apparent in any case that significant regional differences in soils will be a continuing feature of the Recôncavo for some time to come.[18]

132

Climate

Introduction. The northeast of Brazil is an area of tropical climates, without frost except in a few interior highlands, and without pronounced seasonality of temperature. The margins of the sea are generally humid; the interior is dry. Usually the humid maritime belt is narrow, and the transition to the drier Northeastern interior is very rapid.[19] The profound climatic differences between the coast (the praia or beach) and the interior (the sertão) are reflected in the contrasting economies--coastal cultivation and interior livestock industry--and in the deep social gulf which separates the people of the coast and the interior. "The two Northeasts," Freyre calls these contrasting physical and cultural zones.[20]

Along the central coast of Bahia the transition from humid littoral to dry interior has an irregular character, due to the presence of the Serra do Mar (here called the Serra da Papuã) to the ocean south of the Recôncavo. The mountain-backed southern coast is more humid than the lower northern shore. The coastal humid zone is carried inland around the littoral of the Bay.

The temperature pattern of the Recôncavo is relatively simple.[21] The mean annual temperature at Salvador is 25° C. and at Cruz das Almas (the most interior weather station in the Recôncavo), 24° C. Neither

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BB 175 249 in mind when they founded the colony of Bahia.

> Already enough was known of Brazil to hope that sugar cane would do well in it. The hot and humid climate of its coast would be highly favorable, and as for hands for work, they counted mainly on the indigenous people who, as we have seen, were relatively numerous and peaceful on the coast. These perspectives were completely confirmed; the one factor of which they were ignorant before the attempt--the quality of the soil--revealed itself as supremely propitious, at some points at least, on the extensive coast. This was particularly the case in the extreme northeast, on the coastal plain occupied by the state of Pernambuco and on the contours of the Baía de Todos os Santos (the Recôncavo Baiano, as it would be called). These were not the only ones: in a general way all the Brazilian coast paid homage to sugar cane.
>
> It was on this base that the effective occupation and colonization of Brazil was initiated.[7]

BB [134]

By the end of the sixteenth century sugar cane cultivation had spread at least as far as its present western and southern limits in the Recôncavo, on the Paraguaçu and Jaguaripe rivers. Forty engenhos were engaged in the production of sugar.[8] The engenhos were the nuclei of the economic organization of the colony. The cultivation of sugar cane and the milling of sugar demanded a labor force too large to be recruited from among the indigenous Indians.[9] This labor force was supplied from the slave pens of Africa--chiefly on the Guinea Coast and in Angola. The city of Salvador, which had the advantage of a commodious port and a central location among the slave markets of Brazil, was the chief point of debarkation for these Africans.[10]

BB 175 249 464 567

BB [504]

Estimates of the number of slaves imported and the number who remained in Bahia vary over a wide range. In 1583, when the population of Brazil was estimated at 57,000 people, 25,000 were listed as whites, 18,000 as civilized Indians, and 14,000 as Negro slaves. The Negroes were concentrated mainly in Bahia and Pernambuco.[11] It seems likely that in Bahia the number of Negroes was at least equal to the number of whites. These two racial groups and their mixed-blood derivatives

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TABLE XII

COMPOSITION OF RECÔNCAVO POPULATION 1940-1950

Year	Total Population	Urban Centers	Rural Population	Agricultural Labor Force
		Absolute		
1940	924,032	368,932	555,100	189,907
1950	1,072,452	493,944	578,508	196,468
Change	+ 148,420	+125,012	+ 23,408	+ 6,501
		Relative		
1940	100 o/o	40 o/o	60 o/o	21 o/o
1950	100 o/o	46 o/o	54 o/o	18 o/o
Change		+ 6 o/o	- 6 o/o	- 3 o/o
		Growth of Recôncavo Population		
1940 to 1950	16 o/o	34 o/o	4 o/o	3 o/o
		Per cent of Total Growth		
1940 to 1950	100 o/o	84 o/o	16 o/o	4 o/o

connections with the western section of the Recôncavo. On the other hand, its location combines oceanic access with the rest of Brazil, Europe, and the Americas and a direct approach, via the Bay, to all of the central municípios of the Recôncavo.

The major concentrations of rural, agricultural population in the region are in the outer municípios of the Southwestern, Northwestern, and Northern Recôncavo. In the southwest, there is a notable concentration on the Crystalline Uplands. In the northern part of the Recôncavo, the concentrations lie along the dissected edges of the Tertiary taboleiros. Thus most of the agricultural people of the region live in upland areas of deep, porous soils and marginal rainfall. The only major lowland concentration of agricultural people is in the area of Cretaceous clay soils on the Coastal Plain of the Central Recôncavo. The relatively small size of the agricultural population in this area is reflective of the declining role of sugar cane cultivation in the Recôncavo.

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244 311 From the latitude of the head of the Bay northward, manioc appears as a dominant crop only in the município of Pojuca. In the Central Recôncavo, around the perimeter of the sugar cane area, manioc generally occupied, in 1948, less than 30 per cent of the cropland. In the north, [243] along the borders of the Recôncavo, the share of manioc in the cropland dropped to 10 per cent, and it was replaced by corn and beans as the basis of the subsistence economy.

244 311 433 The yield of manioc in the areas of heavy production was relatively low--10 to 15 tons of roots per hectare--compared to the Central Recôncavo which produced small quantities at 30 tons per hectare (Map 27). These [134] differences in yield are related in part to the difference in soil fertility between the Cretaceous soils of the Central Recôncavo and the sandy loams of the Southwest. In addition, manioc is cultivated alone in the former zone, but follows the soil-taxing tobacco plant on the fields of the Southwest, thus further reducing the yield. The mean yield of manioc in the Recôncavo in 1948 was 14 tons per hectare, which is close to the 13 tons per hectare of Brazil and of the French Cameroons, but much higher than the 7 tons per hectare of Java and Madura.[13]

244 249 Manioc is, then, a crop characteristic of most parts of the Recôncavo and the surrounding zone, except in the sugar cane area and [242] the Tabular Uplands. The area of greatest concentration of cultivation and production is the Southwestern Recôncavo where manioc is integrated with tobacco production in a system of land rotation. In addition, as discussed above, manioc has the greatest relative importance of the crops of two zones in which the total area cultivated is small: the southwestern belt of forested lowland and the drier, scrub-forest Crystalline Uplands.

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249 In addition to these major and minor concentrations of production, there was scattered cultivation in most of the outer ring of municípios of the Recôncavo, especially in Catu, in Alagoinhas, and in Santo Estêvão and adjacent western São Gonçalo. On the other hand, tobacco cultivation was conspicuously absent in the Central and Southern Recôncavo.

249 311 In 1948 tobacco was grown on 27 per cent of the total cropland of the region. The zone of intensive tobacco production, as shown by the proportion of the cultivated land which it occupies, is clearly revealed on the accompanying map (Map 32). In a continuous belt, which follows the humid edges of the Uplands and adjacent Intermediate Hills from Santo Antônio to Catu, tobacco was grown on over 30 per cent of all cropland in 1948. There were extensive areas in which over half the cultivated land was in tobacco—a remarkable showing for a non-food commercial crop grown on a small scale by semi-subsistence cultivators.

The gradients which separate the belt of intensive tobacco production from the Bay littoral and from the Central Recôncavo are very steep. On the other hand, the inland transition from intensive tobacco production to the scattered cultivation of the dry caatinga is very gradual. In the lowlands tobacco almost everywhere occupied less than 10 per cent of the cultivated area in 1948; in the caatinga to the west it was grown on 10 to 20 per cent of the total cropland.

249 134 132 There is a basic association between tobacco cultivation and the Crystalline and Tabular Upland; production is concentrated along the wetter, inner edge of these formations, in a zone which closely corresponds to the forest and scrub forest boundary. Tobacco is practically excluded from the humid Coastal Plain and littoral sections of the Intermediate Hills. It might be assumed that the location of tobacco is a result of the monopolization of the humid, clay-soil Coastal Plain

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249 by sugar or other commercial crops, but this does not appear to be the
134 case. There are a few patches of tobacco in the garden plots of sugar
132 cane workers, but the small quantity of tobacco produced in the Central Recôncavo is rank and harsh, despite cultivation practices almost identical with the high-quality areas. Apparently high grade leaf production is excluded by the climate-soil complex of this zone.

Local agronomists and cultivators familiar with tobacco cultivation insist that such areas as Cruz das Almas and São Gonçalo are optimum for tobacco, and certainly the leaf of these areas brings the best price. It is said that the best tobacco in these areas is produced on the "poor" soils of the upland surfaces--leached sandy loams. In the Southwestern Recôncavo the "better" soils--that is, heavier soils found on the slopes and bottomlands--are not used for tobacco, although they produce good yields of corn, beans, or manioc. Precipitation is also a very important locational factor, both indirectly, as an agent in soil formation, and directly, as a source of moisture for the plants. Too little moisture will produce a gummy tobacco which is very difficult to cure. Too much moisture, a rarity in these areas, produces a washed-out, insipid leaf.

A comparison of the maps of tobacco types[16] (Map 138) and of soils (Map 6) and precipitation (Maps 7 and 8) indicates quite clearly that the best grade of tobacco--"Mata"--is grown on the most humid section of the zone of crystalline soils, i.e, the Southwestern Recôncavo and Santo Antônio. This is also, of course, the area of most intensive production. In general this same combination of physical elements is characteristic of the smaller "Mata" area around São Gonçalo.

The second most valuable grade of tobacco, "Caatinga," is grown west of the Southwestern Recôncavo and, within the Recôncavo, in

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249 Santo Estêvão. The third grade—"Feira"—is grown on the humid edge of
134 the sandy Tertiary uplands. This suggests that it is soil which is the
132 immediate control of quality, although precipitation is the over-all factor. Although the southern part of the zone of Tertiary soils is more humid than the crystalline zone peripheral to the Recôncavo, the tobacco of the former--"Feira"—is less valuable than the "Caatinga" grade of the latter. The drier Tertiary zone produces only fumo em corda but the even drier crystalline zone, stretching west to the Chapada Diarantina, manages to produce the cheap but salable "Sertão" leaf. Thus in every case the crystalline soils, with equal or even less precipitation than the Tertiary zone, produce a better grade of leaf tobacco.

249 In 1948 the yields of the main zones of tobacco cultivation were
433 from 750 to 1,000 kilograms per hectare (Map 33). Yields were higher in the Central Recôncavo, where there is only trivial production of low quality leaf. Yields were also higher in isolated sections of the "Sertão" and "Caatinga" grade zones to the west.[17] The mean yield of the Recôncavo, 840 kilograms per hectare, was slightly above the 808 kilograms per hectare of the state of Bahia as a whole. This yield compares very favorably with the yield of Cuba, 640 kilograms per hectare, and Indonesia, 530 to 650 kilograms per hectare on Estates, but is lower than that of Mexico, 1,010, Canada, 1,360, or the United States, 1,400.[18]

[241] The production of most of the chief crops of the Recôncavo is somewhat stabilized by steady demand for food--in the case of manioc, corn, and beans—or by government control—in the case of sugar cane. In contrast, tobacco is a highly speculative and mobile crop. It is produced primarily by small cultivators in anticipation of a combination

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B 249 433 Sugar cane is the fifth or sixth--depending upon the year--most valuable crop grown in Brazil, and it is cultivated, at least on a small scale, in all states of the country. Large scale commercial production, however, is confined to two areas--the Central-South (São Paulo, Rio de Janeiro, and Minas Gerais) and the Northeast (Paraíba, Pernambuco, Alagoas, and Bahia). Each of these states produced over one million tons of cane in 1948.

B BB 249 175 177 In distinction to the principal subsistence crops of the Recôncavo, sugar cane is an old world domesticate. The variety acquired by the Portuguese from the Arabs in North Africa and brought to the colony via the Madeira Islands was the sole type cultivated during most of the colonial period, but today a number of varieties of East or West Indian origin are grown.

BB 249 Sugar cane is differentiated from other crops of the Recôncavo by the intensive monocultural character of its production. Tobacco and manioc and corn and beans are grown jointly, but sugar cane shares the land with no other crop. North of the cidade of Santo Amaro there is BB [134] [139] an extensive area of clay soils and undulating plain almost completely blanketed in bright green sugar cane. The monochrome is interrupted only by a few pastured valley bottoms or by the widely scattered usinas (sugar mills), plantation settlements, and villages. There are similar, though less extensive landscapes wherever sugar cane is important in other parts of the Recôncavo.

The system of cultivation of sugar cane is also very different from those employed in producing other crops in the Recôncavo. One planting is sufficient for several reasons, for the stalk re-develops from the root after the plant is harvested, though with progressively declining vigor. In Bahia, three, four, or five harvests from the

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249 same planting are common--then the field is rested for a year and replanted to cane.[24]

249 311 Sugar cane is encountered in all parts of the Recôncavo, but it is produced commercially only in three very restricted and closely defined areas. Of the 11,695 hectares of sugar cane in the Recôncavo in 1948, over 6,000 hectares were in Santo Amaro and 650 hectares and 2,400 hectares, respectively, in adjacent São Francisco and São Sebastião (Map 44). The remaining one-third of the total sugar cane area was largely in São Filipe, 650 hectares, and Cachoeira, 530 hectares. The association between sugar cane cultivation and the Cretaceous soils is [134] very close. Within the Central Recôncavo, cane is grown only on the Cretaceous massapê, salão, and arêia soils; although there are occasional outliers of Tertiary sands, no cane was observed on these soils in the course of field investigation. Cane cultivation in São Filipe is associated with similar heavy soils--the so-called crystalline massapê. [433] In 1948 the Recôncavo produced 670,626 tons of cane, 39 per cent of the total of the state, but only 2 per cent of Brazil's production. Eighty-two per cent of the cane of the Recôncavo was produced in the Central Recôncavo sugar cane zone of Santo Amaro, São Francisco, and São Sebastião (Map 45).

Because sugar cane cultivation is so highly concentrated, the mean value of 15 per cent of the total cropland of the Recôncavo in sugar cane is somewhat misleading. What is significant is that an estimated 90 per cent of the cropland--excluding fallow land--on the Cretaceous coastal lowland at the head of the Bay was planted to cane in 1948 (Map 46). A similar, though smaller, monocultural zone lay at the head of the Bacia do Iguape in the município of Cachoeira. In the minor sugar cane area of São Filipe, cane production was less concentrated. There was also scattered cane cultivation on the lowlands

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249 and Intermediate Hills between and around these zones, but usually on
311 an exceedingly small scale.

249 The yields calculated for 1948 were as follows:
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Santo Amaro	65.7	tons	per	hectare
São Francisco	80.0	"	"	"
São Sebastião	41.2	"	"	"
Cachoeira	37.0	"	"	"
São Filipe	50.0	"	"	"

These may be compared with 38.7 tons per hectare for Brazil as a whole, 35.0 tons per hectare for Cuba, and 89.3 tons per hectare for Java and
249 Madura for the same year. The relatively low yields of Cachoeira and
433
134 São Filipe are to be explained, at least in part, by the primitive
257 character of cultivation and processing in these more remote areas. São Sebastião is a sort of frontier zone into which the big sugar mills are expanding their operations at the expense of smaller operators, but the methods of production are still less efficient than in the main production area, and the soils are sandier and less fertile. In Santo Amaro, yields are higher on account of generally better soils and techniques, but the demands of the large usinas require intensive and continuous cultivation on even the poorer soils. On the other hand, the less intensive cultivation in São Francisco, where the mills are smaller, allows a freer selection of soils, so that the yields of this area are the highest in the Recôncavo.

244 Sweet Potatoes and Peanuts. Two other American domesticates are
311 grown in the Recôncavo, though on a small scale--peanuts and sweet potatoes. Both are cultivated primarily along the forest and scrub forest transition as auxiliary subsistence crops, in conjunction with manioc and tobacco. There are also scattered plots of these crops in most other parts of the Recôncavo. Neither crop occupied over 1 per cent of the total crop land of the region.

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245 311 small coffee groves occupied as much as one-third of the total cultivated area (Map 56). In São Félix coffee was the second ranking crop in area of cultivation, in São Filipe, the third. The coffee cultivation in these municípios is concentrated along the eastern side of the tobacco-manioc area, on the rough Intermediate Hills. The slope-land soils are relatively fertile; yet there is not too much precipitation [134] [132] for the harvesting and drying of the beans.

Although coffee production in the "coffee zone" beyond the Recôncavo is on a moderately large scale, within the Southwestern Recôncavo coffee is planted in very small, irregular plots. The coffee is shade-grown, usually under a remnant of old mata or under jackfruit and similar trees. Except in São Filipe and São Félix, it is generally cultivated as an auxiliary rather than as a principal crop. The harvest is non-selective, and the entire bush is stripped at one time. 245 311 433 The beans produced under this system are of low quality compared with the selected beans of the Spanish-American highlands, but the people of Bahia claim that their coffee has a special flavor. The mean yield of coffee in the Recôncavo in 1948 was about 300 kilograms per hectare, compared to over 400 kilograms per hectare for Brazil. The main centers of production had yields near the mean of 300 kilograms per hectare, except for São Filipe which produced less than 200 kilograms per hectare (Map 57). Yields, as derived from the official data, were highly variable among the minor producers.

245 Coconut. In a sense the coconut is, like coffee, an alien intrusion into the Recôncavo. Although Bahia is by far the leading producer of coconuts in Brazil—they are called côcos da Bahia—the main centers of production are on the coast north and, to a lesser extent, south of the Recôncavo.

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245 311 Within the Recôncavo coconut production is important along the sandy beach line of the island of Itaparica and along the ocean coast of Salvador, where coconuts are virtually the only agricultural product [133] (Maps 58, 59, and 60). The inner shores of the Bay, which rise abruptly [134] with rocky clay slopes, bear very few coconuts, except in a low-lying sandy zone along the estuary of the Paraguaçu. Coconuts are produced 245 [423] chiefly on large properties which are frequently owned by urban families. [464] The plantations are operated with hired labor drawn from the coastal [438] population. When harvested, the coconuts are sold in the urban markets [258] of Salvador and other cities and towns. Very little of the Recôncavo [439] production is converted into oil, and little is exported.

Oranges. The navel orange is a Bahian development, a mutation [433] of the orange brought from Europe. The main centers of Brazilian production, however, are elsewhere in the country, and cultivation of oranges within the Recôncavo is primarily for local consumption.

245 311 Scattered orange trees are a feature of the rural and urban landscape in many areas. In addition to this generalized cultivation, which frequently is not shown in the official data, there is commercial production in the environs of several urban centers—Alagoinhas, Santo Antônio, and to a lesser extent, Salvador (Maps 61 and 62). The [489] cidades of Alagoinhas and Santo Antônio are both markets for part of [443] the local crop; moreover, both are on the railroads leading to Salvador, which is the chief market for the entire region. In addition to these three main concentrations, there are numerous orange groves in the Southwestern Recôncavo which apparently serve both local and regional markets, though on a small scale. In general the relative area in orange groves is not great, yet in 1948 they occupied 10 per cent of the cropland of Alagoinhas.

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245 438 [471] Oranges, like coconuts, are usually grown on plantations. The capital investment in tree crops is usually too great for small cultivators. Moreover, as a highly perishable crop, oranges require more or less direct marketing, which is frequently beyond the capacity of the small grower. If oranges were marketed by trickling from the small grower through the hands of merchants, buyers, and the like, as is tobacco, they would be spoiled long before reaching the consumer. The small cultivator can market his handful of oranges only in the local market.

241 433 [262] Supplementary Crops. Although the official data show only a very limited distribution of minor supplementary crops, their cultivation is not confined to those municípios where exceptionally conscientious statistical agents have made detailed records. The common vegetables--green beans, onions, garlic, and tomatoes--are cultivated in small quantities in all parts of the Recôncavo and are a traditional part of Bahian dishes. Around the cities and towns there is some specialization [443] in vegetable farming, but there are no major concentrations. The Salvador market is supplied with produce from a broad rural zone which includes [489] most of the Recôncavo. The produce is brought to the city by donkey, truck, or by sailing boat.

The most important of the supplementary commercial crops is [134] pineapple, which is produced on the sandy soils of the Northern, and to a lesser extent, Southwestern Recôncavo. There is very scattered production of grapes, cotton, rice, and white potatoes, but there are no important centers of cultivation of these crops.

245 311 Minor Spontaneous Tree Crops. Mangoes are very common within the houseyards of Salvador and throughout the humid Coastal Plain. In

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245 311 The Atlantic coast of Salvador and Itaparica supports a coconut monoculture--a monoculture which is most strongly developed north of the Recôncavo in Camassari and Mata de São João. The actual area of the coconut monoculture within the Recôncavo is slight, and beyond this monocultural zone, coconut cultivation is rarely significant within the region.

The coconut monoculture lies between the littoral forest and the beach in Itaparica and between the agreste and the beach in Salvador and in the municípios farther north. Except in the município of Salvador, the rural population of the coconut area is not dense. The typical settlement of this zone is the fishing village, sprawled over the beach near the mouth of a small stream. Inland the population is scattered. [161] [162] [361]

243 244 311 A much more important crop system intrudes upon the Northwestern Recôncavo--the corn-bean system. The nuclear area for this system seems to lie in northern Serrinha and in the municípios bordering upon the state of Sergipe. The area in which over 80 per cent of the cropland was in corn and beans in 1948 overlapped the borders of the Recôncavo into western Feira de Santana and Santo Estêvão--a zone of low serras (Map 76). In this zone the area in corn was from one to two times the area in beans (Map 77).

[134] Most of the soils of this region are either crystalline or Tertiary sands, but the pockets of soil which are actually cultivated are almost invariably heavier and more water retentive than are the sandy upland soils of the taboleiros. The corn-bean region generally [162] has a small but nucleated rural population and a few medium-sized cidades, which are the only towns of the very large municípios which are characteristic of the area. [361] However, the part of the corn-bean region which overlaps the Recôncavo has a number of villages and hamlets in the valleys of the serras.

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249 still producing, they are carefully left in place--and narrow, shallow
244 trenches eighteen inches or two feet apart are dug across the field. Segments of manioc stalk, freshly cut and two to four inches long, are planted in the trenches and covered.

(2) When the manioc appears, the plants are slightly hilled, and the field is kept clean.

(3) Any time after six months, but if conditions are not too pressing after nine months, the roots are dug up with a hoe. The disposition of the manioc roots will be discussed in a later section on processing.

(4) The field is re-planted to manioc until it will no longer produce a reasonable yield--one to four years depending upon the fertility.[4]

(5) The field is abandoned to wild vegetation and used as a rough pasture, or, if land is in very short supply, it is fertilized and planted to tobacco.

There are a number of problems which lead to departures from the ideal system of cultivation discussed above:

(1) In many areas where the intensity of cultivation is extreme, no second growth is available, and it is necessary to take fields directly from the cultivation of manioc, or other crops, to the planting of tobacco. It is important to remember that by no means all the soils of the tobacco-manioc region are suitable for tobacco cultivation, even [134] in such favorable centers as Cruz das Almas or São Gonçalo. Only the lighter, sandier soils of the hill tops and upper slopes and occasionally the porous soils of the basins are used for tobacco. These tobacco soils are popularly considered to be "poor," because crops other than tobacco or manioc do not thrive upon them.[5]

[237] (2) A key problem in the main areas of tobacco-manioc cultivation

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243 244 [134] either separately or in conjunction with tobacco and manioc. They are frequently grown on land thought to be not suitable for tobacco cultivation yet too good for manioc alone, such as the steeper slopes of the crystalline area where the heavier soils do not produce good quality tobacco.

Since the area in corn and beans is small and the amount of slope land large, the capoeira is extensive and frequently quite tall. After the slopes are cleared, the land is very often planted to mixed corn and beans, more rarely to one or the other. The crops are planted [221] in March or April, perhaps in May, and even in June for beans alone. The planting season for these crops is extended both because they are tolerant of changes in season and because as crops secondary to tobacco they have a lesser priority. Some corn is usually planted early enough [527] [862] so that it will ripen in time for São João (mid-summer day) festival for which fresh corn-on-the-cob is the traditional food. This festival is usually the beginning of the corn harvest, but the bean harvest [251] begins a month later. Both crops are harvested by hand and, after drying, are shelled by hand, sacked, and either stored or sold. When the fertility of the soil is higher than normal or when there is labor to spare, the field may be planted to manioc after the corn and bean harvest.

243 244 249 311 As a result of the interpenetration of the corn-bean and the tobacco-manioc systems, in many regions and on many individual properties the two co-exist. Usually the upland fields are in tobacco and manioc, with an occasional plot of corn and/or beans. Usually the slope-land plots are in corn or beans.

249 The Cultivation of Sugar Cane. In distinction to the crops discussed above, sugar cane is grown under a system of permanent

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249 311 [134] Commercial sugar cane cultivation is confined to the humid Coastal Plain areas with Cretaceous clay soils, except for a small area in São Filipe. Since the areas of Cretaceous clay soils are limited and compact, sugar cane production is highly localized in two areas: (1) the main sugar cane area in the municípios of Santo Amaro, São Francisco, and São Sebastião; and (2) a smaller area north of the Bacia do Iguape in the município of Cachoeira. There is a third area of less intensive production in southern São Filipe.

249 244 [433] The sole purpose of cultivation in the sugar cane area is the production of a commercial product, but the areas of tobacco-manioc cultivation produce both a staple food and a commodity for sale outside the region. Most of the tobacco and manioc of the Recôncavo are produced under a land rotation system in which the sequence is: (1) tobacco; (2) manioc; and (3) fallow in wild vegetation. The tobacco is planted in small fields, usually after an application of manure. The entire plant is harvested repeatedly until it will no longer produce a salable leaf. Manioc is planted following tobacco, sometimes several times, until the field is exhausted and abandoned to the second growth. The fallow period is frequently short, sometimes as little as one year. Cultivation is entirely by hand--no plows are used. There is very little selection of seed, and only one variety of tobacco--Bahia Brasil--is produced. Tobacco and manioc are produced almost exclusively by small [423] [427] cultivators who are either owners or renters. Frequently livestock [231] [233] are raised upon the properties of the cultivators, but except for the use of manure in the cultivation of tobacco, there is little integration of crop and livestock production. The leaf is harvested, dried, 276 and partially fermented by the cultivator. The marketing of tobacco 276 438 [452] is inseparable from the credit arrangement between the cultivator and [488] the tobacco buyer or agent. The leaf is delivered by the producer to the storekeeper-buyer or the local tobacco warehouse.

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the storekeeper-buyer or the local tobacco warehouse. The roots of the manioc are processed locally, in casas de farinha, and the farinha de mandioca is sold in the local market or to storekeepers in the nearby village or town.

The sub-region of tobacco and manioc production occupies the humid eastern and southern edges of the Uplands. The chief center of production, the Southwestern Recôncavo, occupies a zone of deep, sandy and sandy loam soils lying in flat-surfaced uplands above crystalline rocks. The northern parts of the tobacco-manioc sub-region occupy the rough, dissected southern edge of the sandy Tertiary taboleiros--in this northern area the production of both crops is less intensive than in the Southwestern Recôncavo. The area of primary tobacco and manioc production generally conforms to the forest and scrub forest transition and is expanding southwestward beyond the traditional Recôncavo along this physical boundary zone. The intensity of production is also increasing, but with violent year to year fluctuations.

In addition to sugar cane, tobacco and manioc, other subsistence and commercial products are grown in the Recôncavo. The most important of these are corn and beans, grown as commercial and subsistence crops in the north and west of the region, and coconuts, which are produced along the beach line. Bananas, sweet potatoes, and peanuts are grown in most parts of the Recôncavo, but on a small scale.

There are several areas in which there is little or no cultivation. The rougher Intermediate Hills, which are forested, separate the sugar cane sub-region from the tobacco-manioc sub-region. The lowland areas of Tertiary and crystalline soils are also forested and are cultivated under a non-intensive land rotation system with some associated livestock. The Recôncavo is distinguished from the surrounding areas by its relatively greater mean intensity of cultivation. In the

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249 these individual shortcomings of the industry are less important than,
471 and to a certain extent derived from, three basic problems of the sugar
433 economy: land, market, and leadership.

249 Most of the area of Cretaceous soil in the lowlands of the
[311] Recôncavo presently is occupied by sugar cane or by the fallow fields. Only those lands which are too wet or which are needed for settlement, mills, or transportation are not used for cultivation. Thus there seems to be little opportunity to increase the area of good sugar cane land. It would presumably be possible to reduce the fallow period by lengthening the period of ratoon harvests or to abandon the fallow period altogether. If, as seems likely, these changes would reduce the yield of cane, then it would be necessary to begin to use expensive imported fertilizers in order not to lose the advantages gained by increasing
[242] the intensiveness of cultivation. The introduction of high-yielding Javanese varieties of cane has already been attempted, but because of climatic conditions, soil deficiencies, poor cultivation practices, or a combination of these factors, yields remain below East Indian levels.
[134] It is theoretically possible that sugar cane cultivation could be extended to the other soils of the lowland--the Tertiary sandy soils and the crystalline soils of the peninsula and of the Intermediate Hills west of the Bay. Both of these soils, however, are relatively infertile, and the sandy soils are particularly unsuited for cane because of their poor retention of water. Sugar cane cultivation is not practical on the Uplands on account of the low precipitation--cane can be grown in only a few damp valleys of the Uplands.

175 The second great disadvantage of the sugar cane industry of the
249 Recôncavo is in its market relationship. The history of the sugar cane
439 economy of the region may be summarized as follows. At the end of the sixteenth century the forty engenhos of the Recôncavo exported 1,800 tons

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249 [457] purchased in Europe at the expense of precious foreign exchange, tobacco can be processed for the trade with only a shed and a few crude presses. [489] Rather than a relatively expensive rail net to assemble the crop, tobacco can be carried by truck, small boat, or even by pack animal. More- [433] over, since the cultivation of tobacco is integrated with the production of food and is primarily an activity of small farmers, it is possible to adjust the size of the crop from year to year with a minimum sacrifice of capital investment.

277 The tobacco industry of the Recôncavo has a number of disadvantages as a base for commercial development which may be summarized as problems of: (1) land; (2) markets; and (3) system of production.

249 311 Leaf tobacco production in the Recôncavo and in the adjoining areas of Bahia is confined to a narrow belt between the humid edges of the Up- [134] lands and the dry interior of the state. An expansion toward the coast would bring tobacco first into the Intermediate Hills where the upland soils which are preferred for tobacco cultivation are of limited area and then into the humid lowlands in which the Cretaceous soils are unsuitable, apparently, for the cultivation of quality leaf tobacco. [132] and in which the Tertiary soils are extremely infertile. An expansion westward would bring tobacco into an area where the precipitation in [134] most years is inadequate. The interior north of the tobacco area is dry and has very poor soils, the Tertiary upland soils. There is an [137] opportunity for the further expansion of the cultivation of tobacco toward the southwest along the forest and scrub forest boundary into a region which produces the same general type of tobacco as the Southwestern Recôncavo--the "Mata" grade. This apparently is the meaning of the increased tobacco production in Santo Antônio. It should be possible, at least as far as the soils and climate are concerned, to continue the expansion toward the southwest into the adjoining

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APPENDIX B

Geologic Structure

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135 The Archaean granites, gneisses, schists, and metamorphics are the most common surface rocks in eastern Bahia, where they form part of the so-called crystalline peneplain of Northeast Brazil. The Baía de Todos os Santos and the sedimentary lowlands and uplands north of the Bay occupy a rift in the crystalline platform which extends northward beyond the borders of the state. This rift runs through the center of the Recôncavo and is occupied in the south by an arm of the sea and in the north by sedimentary rock. On each side are crystalline zones, extending far beyond the Recôncavo to the west, but limited on the east by the sea.

[134] In the rift zone the upland deposits primarily are Tertiary, but where erosion has cut deeply, as it has north of the Bay and in major valleys such as that of the Rio Inhambupe, the underlying Cretaceous material has been exposed.

In a few places on the crystalline platform, especially south of the Rio Paraguaçu, there are small remnants of the Tertiary sediments.

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311 soils under more dependable rainfall conditions than are characteristic of the other zones.

The "Caatinga" zone includes Santo Estêvão, Castro Alves, Ipirá, and Santa Teresinha--the município west of Castro Alves. When the rains [132] of the growing season--June, July, and August--are plentiful, these [134] tobaccos are much like those of the "Mata" zone, though somewhat harsher--probably because of the more saline soils. If precipitation is scarce, the tobacco is gummy and requires long curing--two years or so--before use. If the rains fail entirely, a second attempt may be made to plant during the summer rains of November, December, and January.

The "Feira" zone includes Feira de Santana, Coração de Maria, Irará, Alagoinhas, Catu, Pojuca, northeastern Santo Amaro, and northern São Sebastião, as well as Inhambupe, Entre Rios, and Serrinha. "Feira" leaf is often large, rather dark, and moderately strong, and requires at least two years for curing. Like the "Caatinga," its quality varies [132] in response to changes in precipitation, but in general it is more uniform.

"Sertão" tobacco is highly diverse in type and quality. Its zone of production is large in size, extending west to the Chapada Diamantina and southward beyond the Rio de Contas. Generally this leaf is large and coarse, but as a result of the diverse physical conditions in the scattered areas in which the crop is produced, the quality of the leaf is variable over a wide range.

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tant centers of colonial life, and until 1763 Salvador was the capital of the Portuguese colony.

The Recôncavo helped to make Brazil a unique part of the Portuguese empire in the sixteenth century. Brazil was different from any of the other Portuguese colonies, for its wealth proved to lie in agriculture rather than in trade, as was the case in India and Africa. The Bay of All Saints, with a circumference of 200 kilometers, is in effect an inland sea, the entrance to which can be guarded from the heights on which the city of Salvador is situated. There are a number of picturesque islands throughout the bay, with good beaches and landing facilities. Many small rivers empty into the bay, and numerous creeks navigable at high tide extend further inland along its shores. The presence of such a large network of navigable waters was an important factor in the rapid development of the Recôncavo, providing easy and inexpensive transportation of sugar to the point of shipment to Europe.

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The climate is semitropical, with two seasons. Summer, from September to sometime in March, is relatively dry, dotted by showers and thunderstorms and cooled by fresh breezes blowing in from the Atlantic. Winter begins in April, lasting until August or September, the exact time of change differing from year to year. This season is marked by continued rain, usually a soft, constantly falling drizzle or light rain, interspersed with heavy showers, as front after front moves in from the Atlantic, dropping its moisture before being pushed upward by the abruptly rising land which surrounds the Recôncavo. According to statistics for the years 1914 to 1938, the months of minimum rainfall are October, November, and December; during this time the average rainfall was 11.81 inches. The period of maximum rainfall is April, May, and June, with an average of 35.83 inches for the three-month period. The yearly average from 1914 to 1938 was 65.93 inches.[1] The temperature range is from 70 to 90 degrees Fahrenheit.

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The soil of the Recôncavo, especially that of the sugar-Recôncavo, is extraordinarily fertile. It is a heavy black soil, known as massapê, approximately 6 inches to 2 feet thick, covering a clayey subsoil, known locally as taguá. Here and there are outcroppings of sand and mixtures of sand with clay.

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1. Atlas pluviometrico do Brasil (Rio de Janeiro, 1914-1938).

Sugar cane has proved to grow especially well with the combination of warmth, rain, and massapê, and the soil has been producing the same crop for almost four hundred years. The area of massapê is sharply defined, for at its farthest edges the land rises to the regions of sandy scrub forest and desert which characterize what has been called the "other northeast"[2] or the sertão.

The surface of the sugar-Recôncavo is characterized by rolling fields cut by shallow valleys. Although the massapê is not subject to erosion, the other soils, where exposed, are. During the rainy winter season much damage is done, especially to the roads, which for the most part follow the non-massapê soils. Underneath the soil of the sugar-Recôncavo there are recently discovered oil deposits. The quantity of oil has not yet been determined, for the explorations are still going on. However, the national government has already begun to exploit the oil, which is close to the surface. Under Brazilian law, subsoil resources belong to the national government and not to the owner of the lands. As a result there has been a small-scale invasion of petroleum workers on the privately owned lands of the sugar-cane planters. To date, this has not interrupted the agricultural routine to any great extent, at least not in Vila Recôncavo. In Conselho (see map of community), where the drilling was first started, the government bought the land from the individuals and the sugar mill corporation owning it and has turned once green fields of sugar cane into bare fields, spotted here and there with oil wells. The former agriculturalists have had to leave the area or become laborers in the oil camps and refinery.

The Recôncavo is one of the most densely populated regions in Brazil. It is an area of 6,500 square kilometers, with a population of 683,000 in 1940, distributed in 14 counties including the capital. It has an average density of 106 inhabitants per square kilometer,[3] in comparison with the average density of the state of Bahia, which is 7 persons per square kilometer, and with the national average of 5 persons per square kilometer.[4] It must be remembered that these figures include

[TEXT CONTINUED ON PAGE 13]

2. Preston James, Latin America (New York, 1942), p. 411.

3. Aroldo de Azevedo, "Recôncavo da Bahia," Revista da Universidade de São Paulo, I (1950), 14.

4. T. Lynn Smith, Brazil (Baton Rouge, 1947), p. 131.

2t Hutchinson E-4,5 (1950-1951) 1957 SO11 Bahia Brazilians SO11

VILA RECÔNCAVO

[The Usina]

Financially the two units--factory and plantation--are run separately. One set of books is kept for the agricultural part, and one set for the factory. The six plantations combined produced eighteen thousand tons of cane in 1950, although they had planned on twenty-three thousand. The fall in the expected harvest was due to several things. First, less new cane was planted, because of the activities of the petroleum workers who were invading the cane fields of the factory and drilling oil wells. (The first time a field is cut, the percentage of cane is higher than that obtained by cuts during the next four or five years. The same amount of land, therefore, will produce more cane if it is replanted regularly. The factory, however, deemed it wiser to be content with the older plantings for one year because of the oil workers' invasion, for newly planted cane is more subject to damage than an established field.) Second, during that year there was a serious drought which affected adversely the growth of sugar cane. There is no irrigation in the Recôncavo, and during the drought seasons which come periodically a partial crop loss nearly always occurs. In addition one entire taboleiro caught fire and burned to the ground, causing the loss of many tons of cane.

The agricultural cycle and the work on a plantation may be divided into two broad epochs, summer and winter. Summer is the busiest season, for it is harvest time and all hands are occupied, including the migrant workers. The cutters with their machetes cut an average of three to four tons a day apiece, which must be quickly loaded and carried to the factory and milled, for the longer the lapse of time between the two operations, the greater the loss of sugar content. After a field has been cut, one of two things occurs. If it is to be turned into pasture, it is fenced, and the draft animals are turned loose in it. Otherwise the leaves which were cut from the top of the plant and left lying on the ground are burned, and within a short time the roots start sending up new shoots. This old planting (soca) each year gives a decreased yield. As a rule a field is cut and burned three to four years before being turned into pasture. In the days of the old plantations, when the soil was more vigorous, cane of twelve years was considered "new cane." Now, however, the yield is so decreased by the increasing poverty of the soil that three to four years is the best, depending upon the amount of rain. During the summer, if land is prepared and there are prospects of heavy showers, "summer plantings" may be made. They are never as good as those done in the winter, for the sun frequently

226 43 men say that the fish are leaving, while others say there are just as many as ever. It is a difficult thing to prove one way or the other, for written records of the annual catches are only recent. However, there is no such thing as being unable to sell the fish they bring in. Many people in town have increased their consumption of fresh fish as a result of inflation, for it is less expensive than dried or fresh meat. The fishermen themselves eat a great deal of fish, always keeping enough out of a catch for their own family. The planters of the rural area complain that the fresh fish never arrive at the plantations any more as they did in the past. This is probably due to the icehouse in the town. The fishermen sell first to their "usual customers," the women who work with xangó and shrimp; what is left is sold to the icehouse to be packed and shipped to Bahia, rather than being sent out to the country.

226 The jereré, a small basketlike net built around an iron ring 1 1/2 feet in circumference, is used by women and children along the shore and is part of a subsistence activity. It catches only a small crab (siri), an occasional eel, and other small fish which are cooked for the table in the form of moqueca, a sort of stew highly seasoned with peppers and dendê oil. The tideswamps abound in a large crab called the caranguejo, which is also highly prized for the table. Children often catch these, but a man who does so is called a caranguejeiro, a derogatory term. The hunter seeks the crab by sticking his arm down into its hole, which is usually very deep, at least arm's length. As a result he is always covered with the thick black mud so typical of the tideswamps. Often a tropeiro de cima comes to the town and commissions someone to catch the crabs, which he wraps carefully in mud and leaves and carries to the northern hinterland to sell.

463 241 The second largest subgroup in Group 3 is composed of the twenty-four gardeners (roçeiros) who are engaged in small-scale commercial farming, rather than subsistence horticulture. They live in town and have their small fields on the outskirts of Vila Recôncavo. All of these fields are located on the plantation Engenho Da Vila ("P" on map of community), and they range from one, two, or three acres in size to as many as fifteen acres, rented from the plantation at Cr$100,00 an acre per year. The major crops are manioc, bananas, and to a lesser extent tobacco, sugar cane for chewing (cana de chupar), corn, beans, and squash. Because there are only 265

4: Pierson Z-4, 5 (1935-1937) 1967
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Outside the city of Bahia and skirting the rim of All Saints Bay lies the Reconcavo,[1] some sixty miles long and varying from a few to thirty miles wide. Its soil is a cretaceous marl of great thickness, similar to the black gumbo of southern Arkansas and northern Texas, known locally as *massapé* or, in literal translation, "that which sticks to the feet." It is quite fertile and well watered and today appears only slightly impaired after nearly four centuries of cultivation. This is the cane and tobacco area upon which formerly both Bahia's commercial greatness and her need for reliable agricultural (hence slave) labor was based.

The Reconcavo was formerly a center of large landholdings, of a rural aristocracy, of a patriarchal system, and of slavery. Today, cane and tobacco are still cultivated, although the former, and to some extent the latter, languish by reason of the condition of the world-market and the persistence of primitive techniques of production. Although large landholdings are still common, the rural aristocracy is decadent, its prestige having suffered a gradual but persistent decline throughout the late eighteenth and the nineteenth centuries with the loss of the sugar monopoly, the growth of the coastal towns, and the accompanying increase in prestige of the urban professional classes. The abolition of slavery in the late nineteenth century was the final blow, and absentee ownership is now the predominating pattern. However, the present population is more dense in the Reconcavo than elsewhere in the state outside the city of Bahia and remains to this day markedly negroid in character.

[1] The literal meanings of the Portuguese word *reconcavo* are (1) a bay of semicircular shape and (2) the environs of a city. These two meanings appear to have fused in the Bahian use of the term.

4: Pierson Z-4, 5 (1935-1937) 1967
SOll Bahia Brazilians SOll

[City of Salvador]

struggle of native labor versus foreign capital and thus tend to unify rather than to divide the local group. Religious competition has not become severe enough to intensify self-consciousness on the part of rival adherents and thus evoke serious animosities. As far as national affairs are concerned, intense local loyalties had not, at least at the time this study was made, been seriously exacerbated by onerous control from without. A minimum of racial conflict will be evident throughout this account.

THE *ricos* OF THE RIDGES AND THE *pobres* OF THE VALLEYS

One of the things Darwin noted, when he visited Bahia in 1832, was that the city rested upon "a level plain of about three hundred feet in elevation, which in all parts has been worn into flat-bottomed valleys."[1] Today the scene is still much as Darwin saw it. Continuing erosion has merely emphasized the general characteristics of the landscape, transforming the once level plain somewhat more decidedly into alternating ridges, relatively steep declivities, and comparatively narrow valleys.

This physiography of the country has not been without significance in the cultural life of Bahia; for, in general, the distribution of the population by classes, and even to some extent by ethnic divisions, follows quite closely the lay of the land. Along the ridges, which wind with the changing terrain, ordinarily run the principal streets, bearing the chief lines of transportation, whether by streetcar, bus, or automobile. So far as accessibility to the center and other principal parts of the city is concerned, here are the more convenient residential locations. The elevation of the ridges,

[1] Charles Darwin, *The Voyage of the Beagle* ("Harvard Classics," Vol. XXIX [New York, 1909]), p. 521.